CLOSURE COST ESTIMATE WORKSHEET FOR SMALL ARID MSW LANDFILL FORM 1

OWNER:_____ **PERMIT NO._____**

CURRENT RENEWAL YEAR:_____ **Total Volume of Site:_____ CU. YDS.**

TOTAL PERMITTED AREA:_____ACRES **CONVERSION FACTOR: 4840.02 SQ. YDS./ACRE**

AREA CURRENTLY OPEN:_____ACRES **CONVERSION FACTOR: 0.3333 YDS./FT.**

LARGEST AREA TO EVER BE OPEN AT ANY TIME:_____ACRES (use this area for estimating closure costs)

ITEM	QUANTITY	UNITS	UNIT COST	COST	SUBTOTALS
Low Permeability Soil Layer					
Preparation of landfill to receive cover (final grading)		ACRE	$53.75	$	
Clay--compacted, off-site		CU. YD.	$10.63	$	
Clay--compacted, on-site		CU. YD.	$5.67	$	
Low Permeability Soil Layer Subtotal					**$**
Protective Soil (Vegetative) Layer					
Soil--off-site		CU. YD.	$5.20	$	
Soil--on-site		CU. YD.	$1.77	$	
Seeding and mulching		ACRE	$1,500.00	$	
Protective Soil (Vegetative) Layer Subtotal					**$**
Gas System					
Gas vents, _____# of vents, _____ average depth		Lin. FT.		$	
Passive System					
Passive well head flare		EACH		$	
Gas System Subtotal					**$**
Professional Services					
Engineering (Bid Documents)		Lump Sum		$	
Topographic and Boundary Survey		Lump Sum		$	
Engineering (Construction Oversight)		Lump Sum		$	
Professional Services Subtotal					**$**
Total Closure Cost Subtotal					**$**
Miscellaneous					
10% Administration and Contingency (Total Closure Cost Subtotal x 10%)				$	
				$	
				$	
Misc. Subtotal					**$**
TOTAL CURRENT CLOSURE COST					**$**

(Instructions and explanations of bid items and sources of unit costs are provided on the back of this page.)

Contact Person/Cost Estimate Prepared By:_____
Phone Number:_____

Note: Pages 1, 2, and 3 must be submitted at the time of renewal.

CLOSURE COST ESTIMATE WORKSHEET FOR SMALL ARID MSW LANDFILL FORM 1

NOTES:

The closure cost estimate should reflect all expenses required for a third party to perform closure activities on your landfill. The closure activities must be based on the largest area ever to need final closure as per State requirements and the specifics of your closure plan. KDHE has supplied some third party unit costs for certain items based on previously submitted estimates, Means Cost Guides (*Environmental Remediation Cost Data-Assemblies*, *Environmental Remediation Cost Data-Unit Price* and *Site Work & Landscape Cost Data*) and other estimates provided to KDHE by contractors. The Means estimates were multiplied by a factor of 0.85 to adjust national averages to locations in Kansas. You may line out the KDHE-supplied unit costs and write in numbers obtained from actual bids for your site or bids from third party contractors. However, please supply KDHE with the source of your unit cost.

Some unit costs are not provided. KDHE could not obtain usable data to establish a unit cost, or the item is too site-specific. The permittee should complete these unit costs based on characteristics of their particular site.

CLOSURE ITEMS:

Low Permeability Soil Layer

Preparation of landfill to receive cover (final grading): Cost includes grading of waste, daily or intermediate cover, and stockpiles to the required base grades and to develop a working surface on which to apply final cover. (Source: Means 18-05-0101)

Clay--compacted, off-site: Cost includes purchase of the clay, hauling and spreading of the clay, addition of water and compaction. This layer must have a minimum thickness of 18" and must have a permeability of less than $1x10^{-5}$ cm/sec. *Do not include this item if clay is available on-site.* (Source: Means 12.1-220-5150 + clay Means 33-08-0507-02081-2241)

Clay--compacted, on-site: Cost includes hauling and spreading of on-site materials, addition of water and compaction. This layer must have a minimum thickness of 18" and must have a permeability of less than $1x10^{-5}$ cm/sec. (Source: Means 12.1-220-5150)

Protective Soil (Vegetative) Layer

Soil--off-site: Cost includes purchasing and hauling soil to the landfill and spreading of soil on top of the low permeability layer to a depth capable of protecting the low permeability from desiccation due to freeze-thaw. The thickness should correspond to the thickness described in your KDHE-approved closure plan. This layer should also be capable of supporting vegetation. *Do not include this item if soil is available on-site.* (Source: state-wide average + soil Means 17-03-0424)

Soil--on-site: Cost includes the loading of on-site soil and spreading of soil on top of the low permeability layer to a depth capable of protecting the low permeability layer from desiccation due to freeze-thaw. The thickness should correspond to the thickness described in your KDHE-approved closure plan. This layer should also be capable of supporting vegetation. (Source: state-wide average from last year's estimates)

Seeding and Mulching: Cost includes seeding and application of 1" of straw mulch. (Source: state-wide average from last year's estimates)

Gas System

Do not fill out this section unless your landfill currently has gas migrating outside of the landfill boundary.

Gas vents: Cost includes installation of a large diameter boring, installation of piping, installation of gravel pack, and filling of the annular space with low permeability material.

Well head flare: Cost includes installation of a passive well head flare with an auto-ignited solar-powered ignition unit.

Professional Services

Engineering (bid documents): Cost should include development bid documents for project letting from existing closure plans.

Topographic and boundary survey: Cost should include development final closure survey and establishment of final waste boundaries.

Engineering (construction oversight): Cost includes all construction quality assurance inspections and testing required to properly close the landfill and preparation of the certification of closure report.

Miscellaneous

Administration and contingency: Cost should include third party administration of closure and any additional cost contingencies. Assume 10%.

POST-CLOSURE COST ESTIMATE WORKSHEET FOR SMALL ARID MSW LANDFILL FORM 2

OWNER:_____ **PERMIT NO._____**

CURRENT PERMIT RENEWAL YEAR:_____ **Total Volume of Site: _____ CU. YDS.**

TOTAL PERMITTED DISPOSAL AREA:_____ACRES **CONVERSION FACTOR: 4840.02 SQ. YDS./ACRE**
(use this area for estimating post-closure cost)

CONVERSION FACTOR: 0.3333 YDS./FT.

ITEM	QUANTITY	UNITS	UNIT COST	COST	SUBTOTALS
Cover Repair for 5% of the Landfill Area					
5% of the landfill area, ____ acres					
Soil--off-site		CU. YD.	$5.20	$	
Soil--on-site		CU. YD.	$1.77	$	
Cover Repair Subtotal					**$**
Seeding (Reseed 5% of the Landfill Area)					
5% of the landfill area, _____ acres					
Seeding and mulching		ACRE	$1,500.00	$	
Seeding Subtotal					**$**
Groundwater Monitoring					
____ # wells in the approved system					
Sampling personnel labor (2 events/year)		hr.	$35.00	$	
Sample event mobilization (2 events/year)		mile	$0.40	$	
Analytical costs (2 events/year)		sample	$165.00	$	
Monitoring well maintenance		well	$13.00	$	
Monitoring well replacement (___ total lin. ft. of all groundwater wells)		total well footage	$0.20	$	
Groundwater Monitoring Subtotal					**$**
Inspections and Recordkeeping					
Inspections and recordkeeping		Lump Sum		$	
Inspections and Recordkeeping Subtotal					**$**
Remedial System Operations					
Remedial system operations		Lump Sum		$	
Remedial System Operations Subtotal					**$**
Estimated Annual Post-Closure Cost	(sum of all subtotals above)				**$**
Administration and Contingency					
Administration and Contingency (Total Estimated Post-Closure Cost x 10%)				$	
Administration and Contingency Subtotal					**$**
TOTAL ESTIMATED ANNUAL POST-CLOSURE COST					**$**
ESTIMATED 30 YEAR POST-CLOSURE COST		Annual x 30			**$**

(Instructions and explanations of bid items and sources of unit costs are provided on the back of this page.)

Contact Person/Cost Estimate Prepared By:_____
Phone Number:_____

Note: Pages 1, 2, and 3 must be submitted at the time of renewal.

POST-CLOSURE COST ESTIMATE WORKSHEET FOR SMALL ARID MSW LANDFILL FORM 2

NOTES:

The post-closure cost estimate should reflect all expenses required for a third party to perform post-closure maintenance activities on your landfill. The post-closure activities must be based on the area for the entire landfill as per State requirements and the specifics of your post-closure plan. The post-closure estimate is calculated on an annual basis and is multiplied by 30 to reflect the required 30-year post-closure maintenance period. KDHE has supplied some third party unit costs for certain items based on previously submitted estimates, Means Cost Guides (*Environmental Remediation Cost Data-Assemblies, Environmental Remediation Cost Data-Unit Price* and *Site Work & Landscape Cost Data*) and other estimates provided to KDHE by contractors. The Means estimates were multiplied by a factor of 0.85 to adjust national averages to locations in Kansas. You may line out the KDHE-supplied unit costs and write in numbers obtained from actual bids for your site or bids from third party contractors. However, please supply KDHE with the source of your unit cost.

Some unit costs are not provided. KDHE could not obtain usable data to establish a unit cost, or the item is too site-specific. The permittee should complete these unit costs based on characteristics of their particular site.

POST CLOSURE ITEMS:

Cover Repair for 5% of the Landfill Area

Soil--off-site: Cost includes purchasing and hauling soil to the landfill and spreading of soil to fill depressions caused by settlement and erosional rills and gullies. *Do not include this item if soil is available on-site.* (Source: state-wide average + soil Means 17-03-0424)

Soil--on-site: Cost includes loading on-site soil and spreading of soil to fill depressions caused by settlement and erosional rills and gullies. (Source: state-wide average from last year's estimates)

Seeding (Reseed 5% of the Landfill Area)

Seeding and mulching: Cost should include reseeding areas where vegetation has died, failed to establish or eroded away. (Source: state-wide average from last year's estimates)

Groundwater Monitoring

Groundwater sampling personnel labor: Cost should include labor cost to transport personnel to the site and sample wells at a rate of one well per hour. (Source: median hourly rate for ten KDHE leaking underground storage tanks contractors who perform work in the state)

Groundwater sample event mobilization: Cost includes transporting personnel and equipment to the site. (Source: median hourly rate for ten KDHE leaking underground storage tanks contractors who perform work in the state)

Groundwater analytical cost: Cost includes analysis of groundwater samples from all monitoring wells within the approved system twice a year for all constituents listed in Table 1 of K.A.R. 28-29-103 (f)(3). (Source: average labor cost across the state + 10%)

Groundwater monitoring well maintenance: Cost includes replacement of well pads and padlocks. Price is prorated over 30 years and anticipates four hours of labor per well over 30 years.

Groundwater monitoring well replacement: Cost includes replacement of 30% of the groundwater wells over the 30-year post-closure period. The $0.20/total well footage anticipates 30% replacement of all the monitoring wells within 30 years and a well installation rate of $20/ft.

Inspections and Recordkeeping

Inspections and recordkeeping: Cost includes annual inspection and preparation reports outlining required post-closure maintenance and cost of updating the operating record to include all sampling and required recordkeeping. Cost should also include boundary gas inspection.

Remedial Systems Operations

Remedial system operations: If your landfill is currently operating a remedial system or performing long-term corrective action, the annual cost to operate that system must be included.

Administration and Contingency

Administration and contingency: Cost should include third party administration of closure and any additional cost contingencies. Assume 10%.

ESTIMATED LIFE WORKSHEET FOR SMALL ARID MSW LANDFILL FORM 3

OWNER:_____ **PERMIT NO._____**

YEAR:_____

CONVERSION FACTOR: 4840.02 SQ. YDS./ACRE

CONVERSION FACTOR: 0.3333 YDS./FT.

Landfill Site Data:	**QUANTITY**	**UNITS**
Total Site Area		ACRES
Total Area Permitted to Receive Waste		ACRES
Total Area Currently Open		ACRES
Total Area That Received Final Cover		ACRES

Identify Cells That Received Final Cover by Name or Phase:	**AREA**	**UNITS**
1. Pit Number or Designation:		ACRES
2. Pit Number or Designation:		ACRES
3. Pit Number or Designation:		ACRES
4. Pit Number or Designation:		ACRES

Life of Cell / Landfill Data:	**QUANTITY**	**UNITS**
Annual Average Tonnage Received (A)		TONS
Average Compacted Density of Waste (B)		lbs/CU.YD.
Soil-to-Waste Ratio (C) *		
Calculation For Annual Volume:	**QUANTITY**	**UNITS**
Annual Volume (CU.YDS) = [(A x 2000)/B] x [1+C]		CU.YDS.
Total Volume Capacity of Original Site		CU.YDS.
Total Remaining Volume Capacity of Site		CU.YDS.
Remaining Life of Landfill in Years		YEARS

Contact Person/Cost Estimate Prepared By:_____
Phone Number:_____

* Soil used for daily and intermediate cover occupies landfill airspace. The soil-to-waste ratio accounts for the landfill space occupied by soil. Most soil-to-waste ratio estimates range from 1:3 (33%) to 1:10 (10%). KDHE recommends 1:6 (16.7%).

Note: Pages 1, 2, and 3 must be submitted at the time of renewal.